Rapid Assessment Reference Condition Model

The Rapid Assessment is a component of the LANDFIRE project. Reference condition models for the Rapid Assessment were created through a series of expert workshops and a peer-review process in 2004-2005. For more information, please visit www.landfire.gov. Please direct questions to helpdesk@landfire.gov.

Potential Natural Vegetation Group (PNVG):

R9PAPR **Palmetto Prairie**

General Information

Contributors *(additional contributors may be listed under "Model Evolution and Comments")*

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Vegetation Type

Grassland

Dominant Species*

ARBE7 ARSP3
SERE2 LYLU3
ANVI2 VAMY3
QUMI2

General Model Sources

- [x] Literature
- [ ] Local Data
- [ ] Expert Estimate

LANDFIRE Mapping Zones

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Rapid Assessment Model Zones

- [ ] California
- [ ] Great Basin
- [ ] Great Lakes
- [ ] Northeast
- [ ] Northern Plains
- [ ] N-Cent.Rockies
- [ ] Pacific Northwest
- [ ] South Central
- [x] Southeast
- [ ] S. Appalachians
- [ ] Southwest

Geographic Range

Palmetto prairie occurs in south-central and south Florida with the largest concentrations along the Kissimmee River, west and south of Lake Okeechobee, and the region north of Charlotte Harbor in Sarasota and Manatee counties.

Historically its extent was much larger. Harper (1927) indicates palmetto prairie may have covered 2000 to 3000 square miles in south and south-central Florida. The Multispecies Recovery Plan for South Florida (USFWS, 1999) states that dry prairie occurred on the Desoto Plain in most of Desoto, southern Hardee, western Highlands, northeastern Charlotte, southern Manatee, and part of Glades counties; within the Gulf coastal lowlands in parts of Sarasota and southern Manatee counties; on the Osceola Plain in parts of Okeechobee, northern Highlands, southeastern Polk, and Osceola counties; on the intermediate coastal lowlands of the Okeechobee Plain in northeastern Glades, southeastern Highlands, and southwestern Okeechobee counties, and on the Immokalee Rise in part of Hendry County and northern Collier County.

Biophysical Site Description

Palmetto prairie, also called dry prairie, is a mostly treeless grass dominated community that occupies broad flat regions where fire is very frequent because there are no major natural fire barriers. Interspersed throughout the community are areas occupied by wet prairie, ephemeral depression ponds, marshes, flatwoods, and mesic hammocks. Soils are sandy, poorly to somewhat poorly drained, acidic, and nutrient poor. The subtropical climate of the region has a pronounced wet and dry season. During the wet season the water table often is at or above the soil surface, while during the dry season it is a meter or more below the surface.

*Dominant and Indicator Species are from the NRCS PLANTS database. To check a species code, please visit http://plants.usda.gov.

Vegetation Description

The diverse ground cover is dominated by wiregrass (Aristida beyrichiana) with scattered saw palmetto (Serenoa repens) and patches of runner oak (Quercus minima). Other common plants include bottlebrush three awn (A. spiciformis), broomsedge (Andropogon virginicus), fetterbush (Lyonia lucida), rusty lyonia (L. fruiticosa), dwarf blueberry (Vaccinium myrsinities), and yellow eyed grasses (Xyris spp.)

Disturbance Description

The reason for the lack of trees on dry prairie is unclear. There has been considerable discussion suggesting that it is the result of frequent, intense fires. Huffman and Blanchard (1991) observed a significant increase in the extent of trees invading prairie in the Myakka River region after 40 years of fire suppression, and a subsequent reduction in tree cover after fire was reintroduced. FNAI (1990) suggests that the higher frequency of fire is probably the primary factor that limits pine recruitment in this community.

Palmetto prairie was classified as Fire Regime II, with stand replacement fires occurring every 1 to 2 years. The historic fire return interval for palmetto prairie is unclear, but authors indicate it was more frequent than other communities in Florida (Abrahamson and Hartnett, 1990; USFWS, 1999). Harper (1927) indicated that palmetto prairie burned almost every year. FNAI (1990) suggests that the natural fire frequency in dry (palmetto) prairies appears to be every 1 to 4 years. The fire frequency may also result from the historical distribution of palmetto prairie in a natural landscape that was historically essentially devoid of impediments to the spread of fire (USFWS, 1999). This region of Florida has one of the highest incidences of lightning in the U.S. at 8-16 flashes per square kilometer per year, which is the ignition source for natural fires (NWS, 1996-2000). Under these conditions, a single ignition could easily burn thousands of hectares before being naturally extinguished. Most fires occurred in April to June during the transition stage from dry to wet season (Beckage and Platt, 2003).

The wiregrass, palmetto and ericaceous shrubs are highly flammable and palmetto prairie typically burns vigorously and completely, but re-sprouts quickly from underground stems and roots (Abrahamson and Hartnett, 1990; Harper, 1927). The frequent, high severity replacement fires keep the majority of palmetto prairies in Class A, the post replacement phase. Occasionally, surface or mosaic fires would occur during wetter periods. This allows shrubs to increase in height and percent cover as represented by Class B. After 10 years without fire, trees can begin to encroach and become tall enough to survive subsequent fires. This is the source of the scattered trees of Class C. Class B and C may also occur periodically in fire shadows.

Severe, high intensity fires may occur at least once every 10 to 50 years, probably as a result of drought cycles associated with El Nino Southern Oscillation influences. Beckage et. al. (2003) and Gunderson and Snyder (1994) observed significant influences to fire regimes in the Everglades as a result of the El Nino Southern Oscillation. These high intensity fires would be severe enough to kill trees and send the prairie back to Class A.

Because the vegetation is so pyrogenic and burns severely at least once every 10-50 years, late development phases do not occur naturally, although they can now be found on the landscape because of human reduction in fire occurrence. The original model by Outcalt, then Weis, included two later development phases of palmetto prairie. One included a developed tree canopy and was a pine flatwoods community. The second included a late development shrub layer which was integrated into Class C of this model. Neither of these late development classes in the original model occurred on the landscape, based on the VDDT model.

Adjacency or Identification Concerns

The structure of this community is very similar to that of South Florida Slash Pine Flatwoods. Because of historic fire frequency, south Florida slash pine (Pinus elliotti var. densa) does not have the opportunity to

become established. With an interruption in fire frequency, pines will begin to intrude.

Scale Description

Sources of Scale Data ☐ Literature ☐ Local Data ☑ Expert Estimate

This PNVG was probably historically present in a small landscape scale restricted to the southern part of central peninsular Florida. Some patches may have reached 200,000 to 300,000 acres in size.

Issues/Problems

Urban development, fire exclusion, and cattle grazing are common throughout this community. This fragmentation results in an interruption of the natural fire regime.

Model Evolution and Comments

Weis used FRCC model (PAPR) developed by Ken Outcalt with no major modifications and no changes to the VDDT model. Significant changes were made to the model and description based on subsequent review. The biggest change was reducing the original 5 box model to a 3 box model. In the original model Outcalt and Weis included two late development phases of palmetto prairie. By their admission, neither of these classes occurred on the landscape naturally. One included a well developed tree canopy and was a pine flatwoods community. The second included a late development shrub stage which was integrated into Class C of the current model.

In addition, the frequency of mixed and surface fire was increased from the original estimate.

Succession Classes

Succession classes are the equivalent of "Vegetation Fuel Classes" as defined in the Interagency FRCC Guidebook (www.frcc.gov).

Class A 75 %

Early1 All Structures

Description

Class A is the early post-replacement stage. Vegetation is dominated by grasses, primarily wiregrass, numerous forbs, and scattered low saw palmetto and shrubs. Vegetation height is less than 0.5m. Vegetative cover ranges from 75-85%, with the remaining 15-25% occurring as open, bare ground.

Class A occurs from 0-2 years post-fire and succeeds to Class B after 2 years without fire. Replacement fires occur every 2 years in Class A and wind/weather disturbances, primarily flooding, can also work to keep vegetation in this early post-replacement phase. A weather event of this magnitude was estimated to occur once every 30 years.

Indicator Species* and Canopy Position

ARBE7	Middle
ANVI2	Middle
ARSP3	Middle
SERE2	Upper

Upper Layer Lifeform

☐ Herbaceous
☑ Shrub
☐ Tree

Fuel Model 2

Structure Data (for upper layer lifeform)

	Min	Max
Cover	5 %	20 %
Height	Shrub Dwarf <0.5m	Shrub Short 0.5-0.9m
Tree Size Class	no data	

☑ Upper layer lifeform differs from dominant lifeform. Height and cover of dominant lifeform are:

The dominant species is wiregrass (Aristida beyrichiana) which is generally less than 0.5m tall with 60-75% closure.

*Dominant and Indicator Species are from the NRCS PLANTS database. To check a species code, please visit http://plants.usda.gov.

Class B 24 %

Mid1 Closed

Description

Class B is characterized by a closed understory without trees. Grasses still dominate the understory but there are fewer forbs. Saw palmetto and shrubs are becoming a noticeable feature with average heights greater than 0.5m and percent cover up to 50%. There is no bare ground in this class. In later stages of this class, shrubs are more prominent.

Class B occurs from 3-10 years post fire, and succeeds to Class C in the absence of fire. Replacement fires occur in Class B every 2 years. The frequency may be slightly less in the later stages of Class B due to the increase in shrub cover and decrease in fine fuels. Surface or mixed fires may occur during wetter conditions. Surface fires may occur once every 5 years and burn the grassy understory without top-killing the shrubs. This maintains the vegetation in Class B. Mixed fires may occur once every decade. In mixed fires the grass and low shrubs may burn, but taller shrubs survive, and the vegetation remains in Class B. Wind/weather stresses, primarily flooding, can kill the shrub layer and return the vegetation to Class A. A weather event of this magnitude was estimated to occur once every 30 years.

Indicator Species* and Canopy Position

ARBE7	Middle
ANVI2	Middle
SERE2	Upper
QUMI2	Mid-Upper

Upper Layer Lifeform

- ☐ Herbaceous
- ☑ Shrub
- ☐ Tree

Fuel Model 2

Structure Data (for upper layer lifeform)

	Min	*Max*
Cover	10 %	50 %
Height	Shrub Short 0.5-0.9m	Shrub Medium 1.0-2.9m
Tree Size Class	no data	

☑ Upper layer lifeform differs from dominant lifeform. Height and cover of dominant lifeform are:

The dominant species is wiregrass (Aristida beyrichiana) which is generally less than 0.5m tall with 75-90% closure.

*Dominant and Indicator Species are from the NRCS PLANTS database. To check a species code, please visit http://plants.usda.gov.

Class C 1 %

Late1 Closed

Description

Class C is characterized by scattered live oak, pine and/or cabbage palms over an increasingly shrub dominated understory. In the early stages of this class grasses still remain a prominent component of the understory. In later stages the understory is shrub dominated. Shrubs may reach heights greater than 3m and compose greater than 50% cover. The closed condition reflects the density of the shrub understory rather than the canopy closure.

Class C occurs from 11-50 years post fire. After 50 years without fire the prairie transitions into a forested or woodland system such as oak hammock or pine flatwoods. Replacement fires would occur during drought conditions on average every 30 years. This would return the vegetation to the early post-replacement Class A. Mixed or surface fires occurring during wetter conditions would have a limited impact to the developing tree canopy or tall shrubs. These less intense fires would occur 1-2 times per decade. Flooding events can kill the developing tree and shrub canopy, and return the vegetation back to the early replacement condition. A weather event of this magnitude was estimated to occur once every 30 years.

Indicator Species* and Canopy Position

SERE2	Middle
MYCE	Middle
LYLU3	Middle

Upper Layer Lifeform

- ☐ Herbaceous
- ☐ Shrub
- ☑ Tree

Fuel Model 7

Structure Data (for upper layer lifeform)

	Min	Max
Cover	5 %	25 %
Height	Tree Regen <5m	Tree Medium 10-24m
Tree Size Class	Pole 5-9" DBH	

☑ Upper layer lifeform differs from dominant lifeform. Height and cover of dominant lifeform are:

The dominant lifeform in this class is the developing shrub layer. In the early stages, grasses may remain a prominent component. However, as the time since fire increases, shrubs increase in height and percent cover until they are the dominant lifeform. Shrubs may range up to 3m in height and compose greater than 50% cover of the understory.

Class D **0%**

Late1 Open

Description

Indicator Species* and Canopy Position

Structure Data (for upper layer lifeform)

	Min	Max
Cover	%	%
Height		
Tree Size Class		

Upper Layer Lifeform

☐ Herbaceous
☐ Shrub
☐ Tree

☐ Upper layer lifeform differs from dominant lifeform. Height and cover of dominant lifeform are:

Fuel Model no data

Class E **0%**

Late1 Closed

Description

Indicator Species* and Canopy Position

Structure Data (for upper layer lifeform)

	Min	Max
Cover	%	%
Height		
Tree Size Class		

Upper Layer Lifeform

☐ Herbaceous
☐ Shrub
☐ Tree

☑ Upper layer lifeform differs from dominant lifeform. Height and cover of dominant lifeform are:

Fuel Model no data

Disturbances

Non-Fire Disturbances Modeled

☐ Insects/Disease
☑ Wind/Weather/Stress
☐ Native Grazing
☐ Competition
☐ Other:
☐ Other:

Fire Regime Group: **2**

I: 0-35 year frequency, low and mixed severity
II: 0-35 year frequency, replacement severity
III: 35-200 year frequency, low and mixed severity
IV: 35-200 year frequency, replacement severity
V: 200+ year frequency, replacement severity

Historical Fire Size (acres)

Avg: 1000
Min: 1000
Max: 10000

Fire Intervals (FI):
Fire interval is expressed in years for each fire severity class and for all types of fire combined (All Fires). Average FI is the central tendency modeled. Minimum and maximum show the relative range of fire intervals, if known. Probability is the inverse of fire interval in years and is used in reference condition modeling. Percent of all fires is the percent of all fires in that severity class. All values are estimates and not precise.

Sources of Fire Regime Data

☑ Literature
☐ Local Data
☑ Expert Estimate

	Avg FI	*Min FI*	*Max FI*	*Probability*	*Percent of All Fires*
Replacement	2	1	4	0.5	87
Mixed	40			0.025	4
Surface	20			0.05	9
All Fires	2			0.575	

*Dominant and Indicator Species are from the NRCS PLANTS database. To check a species code, please visit http://plants.usda.gov.

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